Ordinance 2015 15-cl-edit-151028-R

Chapter 15.22

Outdoor Lighting

Section 15.22.010 Short Title. This Ordinance may be cited as the "Outdoor Lighting Ordinance" of the City of Cambridge (the "City").

Section 15.22.020 Purpose. The purpose of this Outdoor Lighting Ordinance is to regulate outdoor lighting, as defined in this Ordinance, in the City, the intent being to permit an amount of outdoor lighting that is appropriate to allow for the safe use and enjoyment of outdoor areas, while also mitigating potential nuisance in the form of light trespass and glare to abutters and the public at large, reducing light pollution, and promoting energy conservation.

Section 15.22.030 Definitions.

- **A. Architectural lighting** means lighting designed to reveal architectural beauty, shape and/or form and for which lighting for any other purpose is secondary.
- **B. Building envelope** means the separator between the interior and exterior of a building. Components of the envelope are typically: walls, floors, roofs, fenestrations and doors.
- Correlated color temperature ("CCT") means a specification of the color appearance of the light emitted by a lamp, relating its color to the color of light from a reference source when heated to a particular temperature, measured in Kelvin (K). [RPI Color Research— Center]

D.C.

- E.D. Emergency lighting means lighting that is only activated during an emergency; for instance, lighting for illuminating the path of egress solely during a fire or other emergency situation. or, lighting for security purposes used solely during an alarm.
- F.E. Fully shielded light fixture means a light fixture constructed, and installed, and maintained in such a manner that all light emitted by the light fixture, either directly from the lamp or a diffusing element, or indirectly by reflection or refraction from any part of the light fixture, is projected below the horizontal plane through the light fixture's lowest light-emitting part.
- **G.F. Glare** means lighting entering the eye directly from luminaires or indirectly from reflective surfaces that causes visual discomfort or reduced visibility.

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Commented [CA1]: The Pattern Lighting Handbook makes the point that poorly maintained lights frequently fall out of performance or prescriptive specifications. The Zoning Ordinance includes the term "maintained" in 6.46.

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H.G. High Intensity Discharge ("HID") means a discharge lamp where the emitted energy (light) is produced by the passage of an electric current through a gas. HID includes mercury, metal halide, and high pressure sodium ("HPS") lamps.

ADD DEFINITION FOR "ILLUMINANCE" USED IN DEFINITION FOR VERTICAL ILLUMINANCE. Illuminance or light level means the intensity of visible light hitting or passing through a defined area on a two-dimensional plane, usually measured in lumens per square meter or lux.

ADD DEFINITION FOR "INITIAL LUMENS" (USED IN PRESCRIPTIVE TABLE): OR, BETTER, CHANGE COLUMN HEADING IN PRESCRIPTIVE TABLE TO SAY MAXIMUM ALLOWED LUMENS (INSTEAD OF MAXIMU INITIAL LUMENS)

Initial lumens means the amount of light output from a lamp when it is new.

Commented [CA2]: If the argument for keeping in this definition and that of Low Pressure Sodium is that these terms are mentioned in another definition, then definitions must also be provided for Light Emitting Diodes, Kelvin, illuminance, footcandle, monochromatic, and several other terms.

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- Lamp means a source of optical radiation, often called a "bulb" or "tube," such as, but not limited to incandescent, fluorescent lamps, high-intensity discharge ("HID") lamps, and low pressure sodium ("LPS") lamps, and as well as light-emitting diode ("LED") modules and arrays.
- Landscape lighting means lighting of trees, shrubs, or other plant material as well as ponds and other landscape features. Lighting which is positioned and aimed to illuminate foliage, yards, gardens, sculptures, driveways, walkways, patios, decks, and other exterior areas.
- K.J. Light bulb. See "Lamp.".
- Light fixture. (See "Luminaire") means a complete lighting unit consisting of one or more light bulbs together with the parts designed to distribute the light, to position and protect the lamps and to connect the lamps to the power supply. Sometimes this includes ballasts or drivers, and photocells. For the purpose of this Ordinance, light fixture shall be synonymous with luminaire.
- M.L. Light trespass means lighting that falls beyond the boundaries of the property it is intended to illuminate.
- N.M. Lighting means electric, man-made, or artificial lighting. See lighting equipment.
- Lighting equipment means equipment specifically intended to provide gas or electric illumination, including but not limited to, lamp(s), luminaire(s), ballast(s), poles, posts, lens(es), electrical wiring, and related structures or other necessary or auxiliary components.
- P.O. Lighting plan means a site plan depicting the property lines of all properties for which lighting is proposed, the location and specification of all exterior light fixtures to be installed within the property, their lumen values, mounting heights, shielding- and directionality, controls and the location of all adjacent streets, the positions and uses of abutting properties and properties located directly across a street, any relevant project site conditions, vertical illuminance calculations at the property boundaries, and any additional information required to demonstrate compliance with applicable standards.
- **Q.P.** Lightinging pollution means adverse effects of lighting, as defined in this Ordinance, including, but, not limited to, glare, light trespass, sky glow, energy waste, compromised safety and security, and impacts on the nocturnal environment.
- **R.Q. Lighting Zone ("LZ")** means an overlay zoning system establishing legal limits for lighting for particular parcels, areas, or districts in a community.
- S.R. Low-Pressure Sodium ("LPS") means a discharge lamp where the light is produced by radiation from sodium vapor at a relatively low partial pressure (about 0.001 torr). LPS is a

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Commented [CA3]: This definition makes no sense in an urban environment, and needs greater precision, especially because we are adding back into the Prescriptive standards a row about landscape lighting. (When I suggested this change in the 9/22 draft the reply was that the description is adequate in the Prescriptive Standards, but it is not.)

Commented [CA4]: This definition makes much more sense and allows us to delete the too lenient prescriptive row about parking areas and go back to the MLO standards for landscape lighting.

Commented [CA5]: It is not clear how this is different from "light fixture" or "luminaire."

Commented [CA6]: Shouldn't this include reference to the LEED LPC requirements?

Commented [CA7]: Light Pollution is the common term, not "lighting pollution.'

Commented [CA8]: It is not defined anywhere else in this ordinance and shouldn't be referred to in this way, because THIS IS the definition in this ordinance.

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"tube source" and is monochromatic light.

Commented [CA9]: See comment on HID definition.

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- **T.S.** Lumen means the unit of measure used to quantify the amount of light produced by a lamp or emitted from a luminaire or light fixture (as distinct from "watt" or other measure of a lamp's power consumption).
- U.T. Luminaire. (See "Light Fixture.") means a complete lighting fixture, consisting of a lamp, or lamps and ballast(s) (when applicable), together with the parts designed to distribute the light from the fixture (i.e., reflector, lens, diffuser), to position and protect the fixture, and to connect the fixture to the power supply.
- Lux means the unit of measure used to quantify illuminance, the intensity of visible light

 hitting or passing through a defined area on a two-dimensional plane. the SI unit of

 illuminance. One lux is equals one lumen per square meter and is -1 Lux is a unit of incident
 illuminance approximately equal to 1/10 of a footcandle. One lux equals approximately 1

 footcandle.)
- W.V. New lighting means lighting for areas not previously illuminated, or newly installed lighting of any type, except for replacement lighting or lighting repairs.
- X.W. Outdoor or exterior lighting means lighting equipment installed within the property line and outside the building envelope of a subject property, whether attached to poles, building structures, the earth, or any other location, and any associated lighting control equipment.
- **Y.X. Partly shielded light fixture** means a light fixture with opaque top and translucent or perforated sides, designed to emit most light downward.

Add definition for "Public ways"

- **Z.Y.** Replacement lighting means lighting installed in order to replace existing lighting
- AA.Z. Seasonal lighting means holiday lighting in use for not longer than a four week period in any calendar year, seasonal lighting as defined in Article 7, Section 7.20 of the Cambridge Zoning Ordinance.
- **AA.** Shielded directional light fixture means a light fixture that includes an adjustable mounting device allowing aiming in (more than one) direction and that also contains a shield, hood, cowl, louver, or baffle to reduce direct view of the lamp.

Add definition for "Significant rehabilitation" as used in the Performance standards

- **BB.** Sky glow means the brightening of the nighttime sky that results from scattering and reflection of artificial light by moisture and dust particles in the atmosphere, caused by light directed or reflected upwards or sideways, and, which reduces ability to view the night sky.
- CC. Temporary lighting means lighting not covered under an electrical permit issued by the City's Inspectional Services Department and installed and operated for periods up to 30 days, and thereafter, completely removed and not operated again for a period of at least 630 days.

Commented [CA10]: no one knows what SI means. This rewrite is in alignment with the definition for lumen, above.

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Commented [CA11]: This is wrong. It's not needed, but it should say .1 footcandle.

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Commented [CA12]: This phrase doesn't make any sense

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Commented [CA13]: Add definition for Public Ways. BTW, In Zoning Ordinance, "streets" are defined as including both public and private ways.

Commented [CA14]: This is a circular definition. We need more. At what point does replacement lighting become new lighting? Not clear.

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Commented [CA15]: We might as well just put the same wording as the Zoning Ordinance here.

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Commented [CA16]: This needs to be in here.

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Commented [CA17]: Why do we even need this "Temporary Lighting" definition in here? The only place in the Ordinance where the term "temporary lighting" occurs is in the Exemptions Section, where it is in any case excluded

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Commented [CA18]: This would limit it to four rather than 6 months a year.

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Additional restrictions may apply in zoning districts specified in Article 7, Section 7.20 of the Cambridge Zoning Ordinance.

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Commented [CA19]: Why is this here? This is just a list of definitions, not rules about lighting in the city.

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- **DD.** Unshielded light fixture means a light fixture capable of emitting light in any direction.
- **EE.** Vertical illuminance means illuminance measured or calculated in a plane perpendicular to the property boundary or property line of a subject property.

Section 15.22.040 Effective Date This Ordinance shall take effect on three (3) months from the date of enactment.

Section 15.22.050 General Requirements.

- 1) Conformance with all Applicable Codes. Except as otherwise provided in this Ordinance, all outdoor lighting, as defined in this Ordinance, shall be installed and maintained in conformance with all applicable federal, state, and local laws, rules, and regulations, including, but not limited to, applicable sections of the Massachusetts Building Code, the Cambridge Zoning Ordinance, and the Cambridge Municipal Code. Provisions in the Cambridge Zoning Ordinance Article 7.20 regarding lighting in residential zones A, B, C, and C1 shall remain in force alongside provisions in this Ordinance. Provisions in the Cambridge Zoning Ordinance Articles 6.41, 6.46, and 6.93 regarding lighting parking areas and loading bays remain in force alongside provisions in this ordinance. Nothing in this Ordinance shall be construed to override provisions in the Cambridge Zoning Ordinance Article 7.0 on Signs and Illumination.
- 2) Applicability. Except as set forth in this Ordinance, all outdoor lighting installed after the effective date of this Ordinance shall comply with the requirements of this Ordinance. This includes, but is not limited to, new lighting, replacement lighting, or any other lighting whether attached to structures, poles, the earth, or any other location, including lighting installed by any third party that receives an electrical permit from the City's Inspectional Services Department. Except as otherwise provided in this Ordinance, all outdoor lighting installed prior to the effective date of this Ordinance shall be altered or replaced so as to comply with these requirements within five (5) years of the effective date of this Ordinance.
 - a) Lighting Zones. Accompanying this Ordinance is a map of the City defining an two overlay lighting zones, LZ2 and LZ3, corresponding to internationally-accepted lighting zones codified by the Illuminating Engineering Society, the International Dark Sky Association, and the Green Building Council. LZ2 includes predominantly residential zones of the City and LZ3 includes more densely developed and predominantly commercial zones. In this Ordinance, some standards and requirements vary according to these lighting zone designations.
 - b) Prescriptive and General Performance Standards in LZ2 and LZ3
 - i) In LZ2, all new or significantly rehabilitated properties of 10,000 square feet gross floor area (GFA) or greater must meet the Performance Standards set out in this Ordinance.

 Existing properties of any size may of this size or greater must conform to either the Performance Standards or to the Prescriptive Standards.

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Commented [CA21]: What does this mean with respect to properties large enough for LEED LPC? Do they have to do LEED retroactively or do they get a free pass?

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ii) In LZ3, all new or significantly rehabilitated properties of 25,000 square feet GFA or greater must meet the Performance Standards set out in this Ordinance. All other existing properties of this size or greater must may conform to either the Performance Standards or to the Prescriptive Standards.

- 3) Replacement of Light Fixtures and Light Bulbs. When any outdoor light fixture is replaced, the replacement light fixture shall comply with this Ordinance. Where a light bulb is replaced within an existing non-compliant light fixture, and the light fixture itself is not replaced or repaired aside from the replacement of the light bulb, the light fixture may remain provided that the replacement light bulb is compliant with the applicable initial lumen standards or vertical illuminance standards set forth in this Ordinance, and provided that the light fixture is not otherwise altered to be in greater non-compliance with the requirements of this Ordinance. Any change-out of 25% or more of existing outdoor light fixtures shall trigger change-out of all existing outdoor light fixtures.
- 4) Interim Modifications. Within six months of the effective date of this Ordinance, property owners shall make improvements where possible to eliminate or substantially ameliorate light trespass onto adjacent lots by: (1) replacing a light bulb within an existing light fixture to be in conformance with the lumen standards of this Ordinance, and/or (2) changing the direction of an existing fixture to be directed downward or away from abutting properties.
- 5) Light Color.
 - a) Correlated color temperature of any outdoor light source shall not exceed 3500 Kelvins.

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Commented [CA24]: We added this because the "significant rehabilitation" only refers to building renovation, not specifically to outdoor lighting. Kelly reminded us that this 25% mandate is in many lighting

ordinances.

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6) Prescriptive Standards. Exterior lighting that meets the standards set forth in the table below shall be permitted in the City; however, if the development or significant rehabilitation of at least twenty five thousand (25,000) squar_e feet of Gross Floor Area occurs on a property after the effective date of this Ordinance, then that property shall be required to meet the Performance—Standards set forth in this Ordinance. Any other lighting that does not meet the standards set forth in the table below may be permitted in the City only if it voluntarily meets the Performance—Standards set forth in this Ordinance.

Outdoor Lighting	Maximum	Maximum Height	Shielding and Direction	 Formatted: Font: 10 pt
Category and	Initial -			Formatted Table
Lighting Fixture	Allowed			 Commented [CA25]: The term "initial lumens" is not yet
Type	Lumens Por Light			defined and can be easily misinterpreted t mean 'when first
Unshielded or partly	315	12 feet above	Not applicable	installed."
shielded light fixture		the surface of		
for entries, work		the area to be		
areas, or		illuminated		
walkways,				
placed not less				
than 4 feet				
Unshielded or partly	630	12 feet above	Not applicable	
shielded light fixtures		the surface of		
located in a front yard		the area to be		
between the building		illuminated		
and street in one main				
entry area, placed not				
Fully shielded or	1,050	12 feet above	All light fixtures shall be located,	
shielded directional		the surface of	aimed, and shielded so as to	
light fixtures for		the area to be	minimize light pollution and light	
entries and, walkways,		illuminated	trespass across property boundaries.	
placed not less than 4			In LZ2, light trespass of more than 1	
feet apart., open spaces			<u>lux of vertical luminance shall not be</u>	
or buildings.			allowed.	
			Must be fully shielded or directed	 Formatted: Strikethrough
			away from all properties that are	
			abutting or located directly across a	
			street	

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Fully shielded or Fully shieldeshielded directional light fixtures and for architectural and landscape lighting.	1,260	Not applicable	All light fixtures shall be located, aimed, and shielded so as to minimize light pollution and light trespass across property boundaries. In LZ2, light trespass of more than 1 lux of vertical luminance shall not be allowed.
Fully shielded or shielded directional light fixtures for parking areas, driveways, or outdoor loading bays.	1260 and resulting in not more than 20 lux on any area of the surface being lit	14 feet above the surface of the parking area, driveway or loading bay	All light fixtures shall be located, aimed, and shielded so as to minimize light pollution and light trespass across property boundaries. In LZ2, light trespass of more than 1 lux of vertical luminance shall not be allowed, and lighting must also conform to Zoning Ordinance Article 6.41, 6.46, and 6.93 requirements.

G. Performance Standards. An outdoor lighting installation may only exceed the limitations set forth in the Prescriptive Standards in this Ordinance if the lighting complies with the Performance Standards in this Ordinance. As set forth above, adherence to Performance Standards is required in LZ3 if the development or significant rehabilitation of at least twenty-five thousand (25,000) square feet of Gross Floor Area is to take place occurs on a property after the effective date of this Ordinance, and adherence to Performance Standards is required in LZ2 if the development or significant rehabilitation of at least ten thousand (10,000) square feet of Gross Floor Area is to take place after the effective date of this Ordinance. Existing properties in either Lighting Zone have five years to conform with this requirement, although they will still need to comply with provisions 3 ("replacement of light fixtures and light bulbs") and 4. ("interim modifications")

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the effective date of this Ordinance, then that property shall be required to meet the Performance-Standards set forth below-

1. Standards.

The project must meet the requirements of the Light Pollution Reduction credit of the U.S. Green Building Council's LEED v4 BD+C rating system.

2. Application Requirements. In order to apply the Alternative Performance Standards, a lighting plan as defined in this Ordinance or as required to meet LEED LPR credit certification must be prepared by a registered architect or professional engineer licensed in the Commonwealth of Massachusetts, and submitted to the Inspectional Services Department with accompanying calculations certifying that the lighting depicted in the lighting plan shall conform to the Alternative Performance Standards set forth in this Ordinance. The Alternative Performance Standards shall not be applied unless such a lighting plan has been approved by the Commissioner of Inspectional Services or her/his designee._ Nevertheless, should the lighting as installed and maintained fail to meet the minimum LEED LPC credit requirements and be determined to be in violation of the light trespass protections afforded in the LEED LPR system, than that lighting shall be considered in violaton of this Ordinance.

H. Exemptions from Applicability.

- 1. Lighting within public ways for the principal purpose of illuminating public ways. No exemption shall apply to any lighting within a public way when the purpose of the luminaire or light fixture is to illuminate areas outside the public way, other than as provided in this Ordinance.
- 2. Lighting for public parks or public art that is commissioned, owned, or operated by a city, state, or federal entity, or that is required by the City, by special permit, or otherwise by law to be accessible to the general public however, it will be requested and expected that these entities shall make their best efforts to install and maintain such lighting in a manner that conforms with this Ordinance.
- **3.** Lighting for public monuments, statuary, or the national flag.
- 4. Architectural lighting that has received a Certificate of

Commented [CA28]: define public ways.

Commented [CA29]: Clarify this sentence. It should include protection from public way lighting trespassing on private property. The bill now before the state legislature says "in the case of roadway lgithing or parking lot lighting, whether mounted to poles, buildings, or other structures, the fixture is shielded to reduce glare, sky glow, and light trespass to the greatest extant possible."

Commented [CA30]: There is no reason to totally throw up our hands about this - especially in regards to city owned and operated lighting.

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Appropriateness from the Cambridge Historical Commission or neighborhood conservation district commission.

- **5.** Architectural lighting of structures or buildings listed on the National Register of Historical Places.
- **6.** Lighting solely for signs as regulated under Article 7 of the Cambridge Zoning Ordinance.

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- 7. Temporary Lighting for theatrical or television production, or performance areas, if an electrical permit has been received from the City's Inspectional Services Department.
- 8. Temporary lighting for work areas at construction sites, if an electrical permit has been received from the City's Inspectional Services Department, and if reasonable protections are taken to protect against light pollution and light trespass in LZ2...
- 9. Underwater lighting in swimming pools and other water features.
- 10. Temporary lighting or Sseasonal lighting as defined in this Ordinance.
- **11.** Lighting for hospital emergency departments, including associated helipads.
- 12. Lighting that is only used under emergency conditions.
- 13. Lighting required by federal, state, or local laws, rules or regulations, unless it can reasonably be made to comply with this Ordinance.

Section 15.22.060 **Administrative Exemption.** The Commissioner of Inspectional Services shall have the authority to grant a partial or complete waiver of the requirements of this Ordinance where the property owner has submitted an Application for Administrative Exemption demonstrating that: 1) bringing the source of light for which the administrative exemption is sought into compliance with this Ordinance would constitute a demonstrably unreasonable hardship on the applicant, as balanced against the potential hardships on abutters and others affected by the lighting; or 2) bringing the source of light for which the administrative exemption is sought into compliance with this Ordinance would result in conditions that are detrimental to public health, safety, or welfare. The property owner seeking the administrative exemption shall file the Application for Administrative Exemption with the Inspectional Services Department demonstrating one of the two requirements for an administrative exemption listed above. The ISD shall give fair notice to abutters and others affected by the lighting and provide an opportunity for them to state their case. All decisions on administrative exemptions shall state the reasons clearly and be available as public records.

Section 15.22.070 Enforcement.

- **A. Enforcement Officials.** The Commissioner of Inspectional Services or her/his designee shall be the authorized enforcement personnel charged with the enforcement of the provisions of this Ordinance, and will be given the necessary resources to do so, including light meters with sensitivity to .01 lux.
- **B. Violations.** Authorized enforcement personnel may order and specify remedial actions to be taken by a violator of this Ordinance to achieve compliance, or issue citations, pursuant to G. L.
 - c. 40, § 21D, for violations of these provisions, assessing fines of three hundred dollars for

Commented [CA31]: Temporary lighting in this ordinance can last 30 days. Theatrical lighting is intense and should be short-term.

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each such violation. Each day such a violation continues shall constitute a separate offense. Additionally, any person found to be in violation of any of the provisions of this Ordinance may be prosecuted for a misdemeanor and upon conviction thereof shall be fined three hundred dollars for each such misdemeanor.

- C. Injunction. As an additional remedy, any outdoor lighting installed or maintained in violation of any provision of this Ordinance may be subject to abatement summarily by a restraining order or injunction issued by a court of competent jurisdiction.
- Suspension or Revocation of Permit. As an additional remedy, any enforcement official hereunder may summarily suspend, and after a hearing may revoke, any license or permit, including a building, demolition, or electrical permit